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Research-in-Progress

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Abstract

This research in progress proposes an approach to technology adoption that focuses on technology as sign and symbol. Drawing from social theory and consumer behavior literature, we initiate a qualitative study that uses both subject narrative and a visual interpretation of the subject (through photographs of the subject and their technology) to identify how each subject's social environment builds his or her understanding of the object and its attractiveness. The study is a two-phase project. Phase I involves both a large-scale collection of subject narratives about their technologies and an interpretation of subject images. Phase II involves an interpretation of the results from a series of personal face-to-face interviews of subjects in public venues. The results from these two phases of data collection and analysis will be presented and discussed at the conference.

Keywords: adoption, mobile technology, content analysis, technology adoption, mobile computing, social values, photography

The purpose of this study is to use a much broader theory base to extend our understanding of how individual decisions about personal technologies are formed, and why some technologies (or iterations of those technologies) are preferred while others are not. The traditional approach to this question has focused largely on quantitative methodologies to test models of adoption; still, in spite of the volume of this work, there remain numerous unexplained aspects of the process of personal choices of technology. To some extent, the inquiry has been dominated by the evolving family of theory that began with the Technology Acceptance Model (Davis, 1989; Davis and Bagozzi, 1989) and the current TAM inspired inquiries such as UTAUT (Venkatesh, et al, 2003). While this work continues to yield valuable information on technology adoption, it does so in a framework of increasing structural complexity with decreasing returns from that complexity.

While these TAM studies have yielded useful results, the systematic dominance of the TAM-genre paradigm has somewhat precluded the exploration of alternative approaches that have the possibility of enriching our understanding as to how people reach adoption decisions. Fortunately, the increasing interest in qualitative methodologies (e.g., Levina & Orlikowski 2009; Myers, 1997; Markus & Lee, 2000; Orlikowski, 1992, 2008) opens up a much broader spectrum of possible explorations in adoption research. The research we are conducting here is predicated on a fairly rich body of social theory and consumer research that indicates that many purchase/adoption decisions are predicated on the "purchasers"' attraction to the symbolic attributes of the product. In addition to aligning our work toward these symbol-oriented theoretical constructs, we are also using a variety of qualitative techniques to uncover how the symbolic and utilitarian aspects of technology interact in the subjects' decisions to adopt.

Object and Meaning

We begin with Feenberg's (Feenberg, 2001) assertion of the dual nature of technology as both utile and symbolic object:

> "...the essence of technology is abstracted from a larger social context within which functionality plays a specific limited role. Technologies do of course have a causal aspect, but they also have a *symbolic* aspect that is determining for their use..." (Feenberg, 2001: pg 84).

Feenberg's definition provides us with two important concepts: First, that technology has both utile and symbolic value; and second, that technologies' values are socially constructed. The first concept, that technology has both utile and symbolic components, places technology squarely into the category of "objects" subject to analyses suggested by Baudrillard (2005) and a variety of consumer researchers. The second concept is critical too, in that it confirms the social construction of a technology's meaning, again validating the appropriateness of studying technology with a social constructivist approach (Orlikowski, 1992). Although these assertions may seem intuitively obvious, it is imperative that they be accurately clarified; because of the complex system of determination of an information technology's utility, it is as much *process* (in the sense of its service-process, i.e., the phone makes phone calls) as *object* and its availability to study as *object* (as opposed to process) must be determined to move it forward as an object of consumption. Consider for instance the predictive components of classic TAM (Davis and Bagozzi, 1989); these components (usefulness and usability) are orientated specifically towards analyzing the adoption decision within its context as process-deliverer. With contemporary UTAUT, there is an acknowledgement of social influence, but social influence constrained to a construct of support of the subjects' *adoption-to-use* the technology[1] While the introduction of some external influence to the adoption decision is one of the most important contributions that UTAUT brings to our understanding of technology adoption, there remain vast possibilities for a better understanding of the social construction of the technology-object's meaning and how these social constructions influence decisions to adopt.

Baudrillard and the System of Objects

As noted earlier, the construct of technology as consumption object is an important theoretical precondition to moving into a deeper understanding of how our impressions of technology are influenced heavily by meanings that are socially constructed. These meanings not only define our understanding of the object as object, but perhaps of

[1] Consider the measures that are used for the social influence construct: people who influence my behavior think I should use [technology x], people who are important to me think I should use [technology x], senior management of this business has been helpful in the use [technology x], in general the organization has supported the use of [technology x]. These items define a construct of social influence of technology adoption in terms of its network externalities, i.e., in terms of its utility and support as part of an organizational technological network.

equal importance, the technology-object as symbol. Baudrillard (2005) notes four fundamental characteristics of objects: the exchange value, the functional value, the sign value, and the symbol value. The first two characteristics are consistent with the TAM-genre theories, exchange value is a cost (and implicitly a cost–to-performance evaluation) understanding of a technology-object, and functional value represents utility (more here a combination of both usefulness and ease of use). These first two elements do differ to some extent from TAM-genre models, in the sense that these evaluations themselves are considered as social constructions.[2]

The larger theoretical space between TAM-genre models and Baudrillard takes place with the introduction of sign and symbol values of the technology-object; neither of these are present among the dominant TAM-genre models, and do not appear to be considered among any other adoption models. Yet, the sign and symbol value of the technology-object may be a critical component of adoption decisions. The sign value of the technology-object exists in its position and interpretation relative to other objects in the object system. The sign value then is an evaluation and set of meanings of the object in relation to other objects, and which carries meanings that can include tastefulness, quality, etc., all of which can vary when the object exists in different object systems. These characteristics also can accrue to the owner of the object. The object's symbolic value exists in its representation of some specifically social characteristic between subjects, such as education, marital status, membership, etc. To illustrate all of these taken together, consider a class ring: its functional value is fairly nil, it is simple adornment (which is an aesthetic function); its exchange value is its price plus any additional rarity/desirability value it may possess; its sign value exists in the different signals its design may confer (perhaps different signals of taste versus tradition in the signet versus military style of ring, the amount of gold and size of the ring, and perhaps the type of stone); and finally as a symbol it suggests a college educated owner, and perhaps the prestige of the university of its bearer. With a technology-object, we can observe the same kind understanding. Consider the Apple iPad: Functionally, it provides a number of computational and communication functions, which are valued differently among different social groups (some may place more emphasis on work functions, others on entertainment, and others still on communication); its exchange value is its cost, which is based on its broader market desirability (with little local variation); its symbol value varies among different groups, where it can represent status, hipness, technological prowess; and its sign value places it within a system of computing devices, such as laptops or other tablets, which in turn carries elements of taste, cool, etc…*on it as object alone*.

This sign and symbol elements carry an additional element that must be considered when describing the technology-object; Going back to our iPad example, we see a desirable technology-object that signals state of the art, new wave, etc. and which should serve its owner as a symbol of tech hipness, forward thinking, etc. However, if the owner is an incompetent user of the technology, its sign value remains intact, but its symbol value/meaning will be substantially altered. Perhaps this exists in other symbol meanings…an ill-fitting designer dress, a fine instrument poorly played; the subject him or herself alters the symbolic meaning independent from the object's sign-meaning within the broader system of objects.

Taken together, these socially constructed elements form the basis of a subject's decision to adopt any particular technology, offering us an entirely socially constructed model of technology adoption.

Consumer research and social desirability

Researchers in consumer behavior have a fairly robust literature that examines the symbolic nature of the objects of consumption.[3] Studies such as Leigh and Gabel (1992), Tsai (2005), and Solomon, (1983), demonstrate a clear interaction between consumers' decisions to purchase and their perceptions of the social desirability of the product. Further, these studies indicate that the consumer then sees the introduction of these social cues associated with the product as enhancing (or defining) their own social identity amongst their relevant social referents. Beyond their pure utility, information technology products are also consumer goods, and thus should be imbued with the same sets of social considerations and social utilities as other forms of products. Rindova and Petkova (2007) argue, in a theoretical framework, that product form has an effect on consumer interest in new technologies (albeit not specifically applied to information technologies), and that technological adoptions are contingent on appealing form and *emotional* attraction. While not specifically speaking to the consumers' decisions about social cues, they do

[2] This does not in any way obviate the value of TAM-genre constructs, which are measurements of subject attitudes that are socially pre-constructed prior to the measurement. Rather, what they are showing us is the process for the antecedent determination of those attitudes within a particular context.

[3] Although these consumer behavior models are based on private consumption choices, individual adoptions in organizations model on the same choice as the consumption or adoption decisions of subjects in consumer contexts.

underscore the importance of an "emotional" component to decisions to purchase/adopt, indicating that there is a much more complex set of decisions taking place in technology adoption than are accounted for in extant adoption models.

Study Method

Given the above theoretical cues, our goal is to design a study that examines the social construction of the meaning of technology objects (in the present case we will be examining personal technologies, i.e., watches, cell phones, music players, laptops...anything that is carried by the subject) and the set of perceived social cues that are associated with them. Our goal is to enhance our understanding of the "black box" of purchase/adoption decisions that currently exists in the information technology adoption literature. We chose personal technologies as the focus of examination, because these technologies represent the greatest possible involvement of the subject in the process of adoption; work/organizational technologies have are significantly influenced by organization mandate (e.g., I must use MS Word because my company does or I use a Dell laptop because it is provided to me) which confounds the influence and choice of the subject themselves.

To get at this information, in addition to a qualitative survey (see *Methods* below) we adopted a radically qualitative research methodology that confronts the subject with his or her own technology array, and then asks them to explain why they have *what* they have. In many respects, we are motivated by the work of Holbrook and others (Holbrook, 1987) who created the "Consumer Behavior Odyssey," wherein (amongst a variety of activities) researchers would invade the personal spaces of subjects and categorize and interpret the meaning behind the consumption patterns that they discovered therein. Part of the beauty of this methodology exists in the confrontation between the consumer and the explicit array of products placed before them by the research team; this confrontation can yield a sometimes-cathartic expression of purpose by the consumer that could never have been anticipated with a survey designed ahead of time, or even through guided questioning.

While we are not anticipating invading homes, we are proposing to ask subjects to reveal (in deliberately public locales) the full set of technologies they are carrying on their person, and to then (after they have visually confronted the breadth of their technologies arrayed before them) probe the subjects (in guided interviews) for the meaning of these technical objects, both purposive and symbolic. We are hoping that through this technique, we will be able to extract a clear narrative about the symbolic purpose of the various technologies they carry, and how these social/symbolic meanings interact with the technical purpose to form a purchasing decision.

Study phase 1

An open-ended survey asked students (n=149) to list the battery operated technologies that they were carrying on the day of their participation in our study. Besides collecting demographic data, the survey asked students to 1) reflect on the reasons why they chose to carry particular technologies, 2) to discuss if they had to choose just one device to carry with them which would they choose, 3) to reveal which of the gadgets they carried around did they feel most reflected their identity, and 4) to list the similar technologies that their friends also carried around with them. The participants produced a corpus of 12,722 words which reflected their experiences with mobile technologies.

The analysis began by developing an *A priori* code list (Miles & Huberman, 1994). The code list was framed by Baudrillard's (2005) four characteristics of objects: the exchange value, the functional value, the sign value, and the symbolic value. We examined the linguistic content of the open-ended questions to identify the characteristics embedded within mobile devices carried by the research participants. The code list allowed for a technology to be assigned to multiple characteristics. For example, the below statement was coded into three characteristic categories because the participant identified the object's 1) **functional value** by describing its multi-tasking utility, 2) **sign value** by naming the iPhone brand, and 3) **symbolic value** by describing the technology's facilitation of social connections.

> "When I'm on my iPhone I can multi-task. I like talking to others while at the same time checking my recent emails." [female, age 19, pre-business major]

The final stage of the analysis was to deconstruct the symbolic values of the 15 technology-objects that were identified by our participants. We used an inductive, open-coding approach to search for emerging themes in the word choices used to represent the symbolic characteristics of the technology objects. Open coding is an analysis process that involves "breaking down, examining, comparing, conceptualizing, and categorizing data" (Strauss & Corbin, 1990, p. 61). Word choices in context are said to reveal a "conceptual lens" of the communicator (Sapir,

1983; Whorf, 1956; Bliss, et al., 1983; Miles & Huberman, 1994). For example, the following statement was coded with the *status* symbolic value because the technology represented a desirable position or standing as compared to others, "The Blackberry Curve shows that I am up to date with technology." [male, age 20, finance major]

Following their completion of the questionnaire, each subject was then photographed with their technology(s) in a pose of their own selection against neutral background (See Figure 1). The presentation of posture and attitude reveals a in a physical way, some approximation of the person the subject wishes to convey. We felt that had we constrained them to an artificially imposed presentation would strip away an important layer of the subjects' own presentation of their public selves (which becomes important in our Phase 2 work).

Study Phase II

In the second phase of the study we will develop a new series of questions and follow-up cues to conduct a series of face-to-face interviews with subjects. During these sessions, we will have the subjects lay out their technology-objects and ask them questions about their meaning, how they evaluate them, and the influences that led to those evaluations. We will be taping these interviews for transcription and later review. We will also be photographing these subjects, so as to be able to interpret their technology/personal presentation system together. These data will then be analyzed following the earlier format. The photographs of the subjects (both from Phase 1 and from Phase 2) give us a record of the subject, and allow us to look for convergences and divergences between their technologies and their clothing selections, and how they present themselves. Our goal is to have panel categorizations of these photographs, to determine how subjects' physical appearance suggest style consciousness, conformity, and social identification, and to then use these categorizations with our other information to create an enriched narrative.

Figure 1: Photograph taken for this research of subject (full length, neutral background). Also note that the pose is the subject's own selection.

Preliminary Results

Figure 2 illustrates the multiple-characteristics of the 15 technology objects that participants (n=149) reported to be carrying on day of the study. All technology objects were reported to possess functional and symbolic values. The

sign value was identified when describing both name brand smart phones and Apple music devices. Generic cell phones were also coded with the sign value when participants mentioned the quality of their mobile device or when they mentioned that the lack of a name brand object was a characteristic that the participant identified with. Even generic objects such as laptops or mp3 players were appropriated for more than their utility. As one participant wrote, "Every modern person I think should carry a cell phone. I think it's a necessity nowadays. So it's just kinda normal to be carried with me." [male, age 21, finance major]

While Figure 2 illustrated several broad characteristics of technology-objects, further analysis refined the granularity of the social construction of technology-objects. Eight themes emerged: status (savviness, hipness, independence), access (information, web, personal contacts, photos, records/files), personalize (adaptation to individual needs and preferences), simplify (make less complicated, mobility, organization), taste (perception of enjoyment, aesthetic, appreciation), education (student, major, professional, athlete, social (communication and social norm [i.e. everybody has one]), and equalizer (assistive technology, medical device).

Once coded, a network diagram (Figure 3) was created to show the relationships between the **sign** and the **symbol** values of technology-objects. Fifteen technology-objects were divided into their four sign values (cell phones, music devices, computers, and productivity tools). Eight symbolic values, in turn, describes the sign values of these technology-objects. The Blackberry was the only technology which saturated all the symbolic categories. The rank-order of the symbolic values possessed by 15 different technologies seems to indicate the importance of the technology-object as a status indicator.

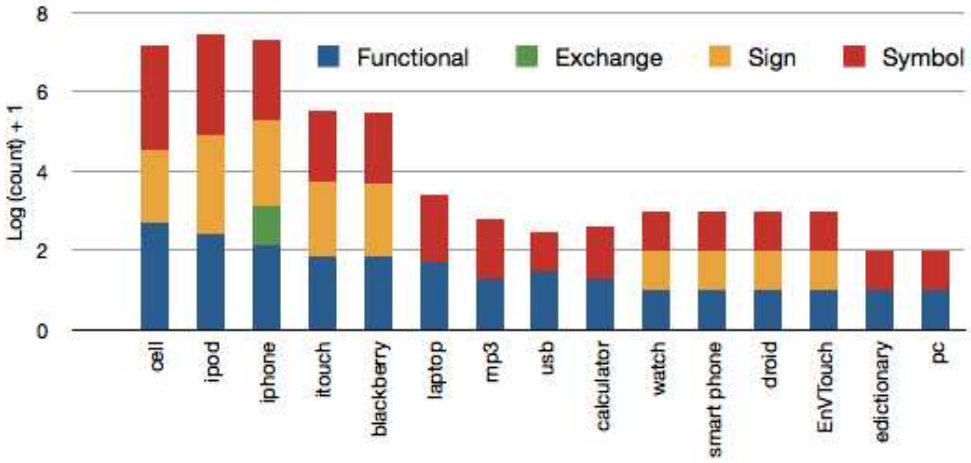

Figure 2: Four Characteristics of Technology-Objects

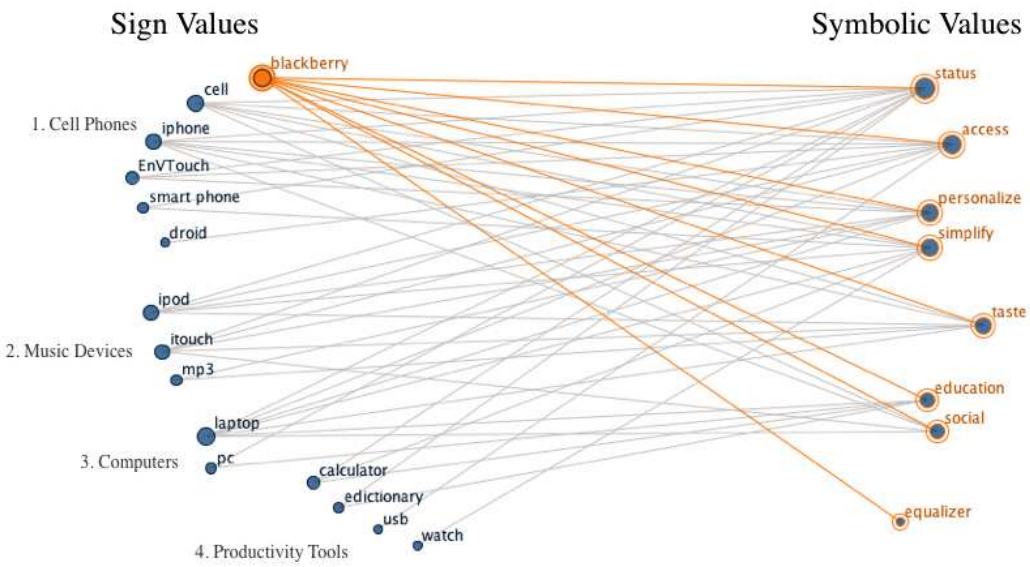

Figure 3: Network Diagram of the Relationship Between Sign and Symbolic Values

Status of the study

We have completed the data collection of Phase 1, and have coded the narrative data, and begun an interpretation of the subject images. We will be conducting Phase II of the study through the summer, and should have most, if not all of our analyses done by the time of the conference.

Discussion

We feel that this study introduces an important investigative lens to the adoption process that is consistent with extant models of adoption, but which we hope will add significantly to our understanding of how the subject arrived at his or her assessments of the elements of the TAM-genre models. While it remains too early in the data collection to offer any firm conclusions about our approach, there are some explanatory elements that are emerging.

First, both from some preliminary interviews that we have conducted, it is becoming clear that much of what subjects know about technology is received from others. There is clearly a network of information available, from review sites on the Web to the recommendations from their more immediate social networks. All of these elements form their sense of the functionality and exchange value of their technology-objects. When subjects begin to relate what their technology-objects "mean," their narrative refers to a relatively tight social network where their technologies are more likely to be visibly displayed. Within these narratives we are hearing elements of conformity, membership display, and status seeking that indicate that the adoption of technology-objects is much more complex and much more socially predicated than most contemporary models anticipate.

The student narrative illustrated that technology-objects are embodied with elements that are socially constructed. When answering the research question about what technology most resembled the identity of the respondent, two juxtaposed examples reveal that calculators and cell phones can have opposite meanings based on the individual who happens to be carrying that technology.

> "Cell phone because it is what I use to keep in touch with people. Plus a calculator does not say much about anyone." [female, age 21, business undeclared major]

> "The graphing calculator would reflect the most of who I am or what I do on a daily basis. This would describe myself first a student and second an engineering-related person. I feel the cell phone not much because almost everyone has one nowadays in this country." [male, age 26, mechanical engineering major]

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